

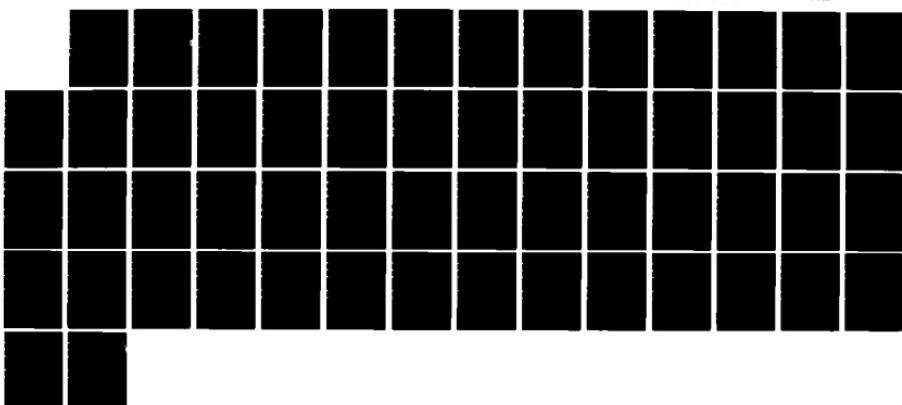
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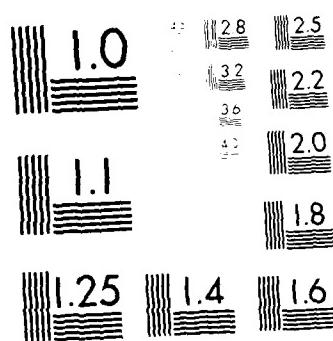
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AIR FORCE INTEGRATED READINESS MEASUREMENT SYSTEM (AFIRMS)

AD-A170 525

**MILITARY AIRLIFT COMMAND (MAC)
AFIRMS REQUIREMENTS ANALYSIS**

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Prepared by

SofTech, Inc.
2000 N. Beauregard St.
Alexandria, VA 22311-1794

30 September 1985

Prepared for

United States Air Force
Readiness Assessment Group

Contract No. F49642-83-C-0022

CDRL 0048

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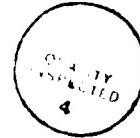
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SECTION 1. GENERAL

1.1 Purpose of the MAC AFIRMS Requirements Analysis Report. This report is based on a study carried out by SofTech in July and August of 1985. The results are based on the interviews of 111 personnel at Headquarters, Military Airlift Command (HQ MAC), HQ 21st Air Force (21AF), HQ 23rd Air Force (23AF), 438th Military Airlift Wing (438 MAW), and 314th Tactical Airlift Wing (314 TAW). Also, two MAC airlift studies of command and control information flows and a capability assessment system were analyzed for AFIRMS significance.

The study is an initial analysis effort to evaluate the capability of the Air Force Integrated Readiness Measurement System (AFIRMS) to meet the needs of MAC. While further analysis will be needed to develop and implement the MAC AFIRMS, this analysis effort will point the way for the follow on developmental analysis. The MAC requirements analysis is a small part of the development of AFIRMS, a summary of which appears in the following two sections.

The purpose of this report is to discuss MAC AFIRMS information requirements, identify the potential MAC users of AFIRMS and any automated data processing (ADP) systems that AFIRMS will need to interface with in order to obtain the data it needs. Prior to July 1985, a Learning Prototype Phase (LPP) tested the basic concepts of AFIRMS on an experimental testbed system which linked a base, a major command (MAJCOM) headquarters, and Headquarters, United States Air Force (HQ USAF). The prototype focused on the tactical fighter environment at Headquarters, United States Air Forces in Europe (HQ USAFE) and Spangdahlem Air Base.

This study and a concurrent study of the Strategic Air Command (SAC) broaden the base upon which AFIRMS rests. This base will support the definition and design phase of the AFIRMS development.

1.2 Key AFIRMS Concepts. AFIRMS is an automated, tasking based, capability assessment system. As such, AFIRMS evaluates unit and force capability to perform tasked missions based on the availability of specific resources.

a. The conceptual requirements for AFIRMS are two-fold:

- (1) Assessment of combat capability against specific tasking. The user can assess unit/force combat capability against any planned or ad hoc tasking, e.g., War Mobilization Plan (WMP), Operation Plan (OPlan), Fragmentary Order, Air Tasking Order (ATO), Contingency Plan, etc.
- (2) Assessment of combat capability based on budget appropriations. AFIRMS provides a tool for computing long-term readiness and sustainability trends, spanning two to six fiscal years. This tool permits comparison of readiness and sustainability by fiscal year and can therefore highlight the impact of appropriation changes. Thus, changes in funding are related to changes in force readiness and sustainability. Also, senior Air Force decision makers are supported during budget deliberations and Air Force budget allocations.

b. AFIRMS implementation has two key concepts:

- (1) Integrated approach to tasking based capability assessments. AFIRMS has two integrative dimensions. First, all applicable resources and their usage interactions are considered. For example, in sortie capability assessment, AFIRMS evaluates capability in terms of all four essential resource types (aircrew, aircraft, munitions, fuel), their interdependences, and their generative components (such as spares for aircraft, training qualifications for aircrew, load crews for munitions, and hot pits for fuel). Second, other automated systems (such as Combat Supplies Management System (CSMS), Combat Fuels Management System (CFMS), Weapon System Management Information System (WSMIS), etc.) outputs are integrated into capability assessment calculations through system interfaces between those systems and AFIRMS.
- (2) Data Quality Assurance. Capability assessment is not better than the data upon which it is based. Therefore, AFIRMS emphasizes a user orientation toward quality assurance of data source. Unit and other data input level users are provided effective tools to accomplish their daily activities and therefore develop a vested interest in AFIRMS data currency and validity. Capability assessment data can then be extracted for use by higher or parallel users with maximum confidence in its validity.

1.3 AFIRMS Functions. Four basic AFIRMS functions combine to assess readiness capability:

- a. Translate Tasking. As a tasking based capability assessment system, tasking must be converted into a standard format recognized by AFIRMS. Tasking is defined in AFIRMS to the unit level and may consist of actual, hypothetical standard, or contingency tasking. Any of these taskings can be defined within specified WMP or OPlan constraints, at the option of the user. Likewise, the tasking may be defined by the user for present, historic, or future requirements.
- b. Define Resources. The resource definition function of AFIRMS ensures that information about inventory status is available and accurate. Wherever possible, this data is obtained by interface with other functional systems. As with tasking, resource information can be defined for actual, hypothetical, standard, or contingency situations, either present, historic, or future.
- c. Determine Ability to Perform. Determining the force's ability to perform is the essential function of AFIRMS. The tasking and resource data are processed to determine how much of the specified tasking can be accomplished with the resources available. Ability to perform is evaluated in terms of the task metric (sorties, etc.) and the cost metric (dollars) to provide readiness/sustainability and dollars to readiness assessments.
- d. Aggregate, Analyze, and Present Data. Aggregation, analysis, and presentation ensure the proper grouping and display of information to provide useful information at the unit, major command, and HQ USAF. Aggregation refers to the creation of a composite understanding of capability for several units.

1.4 References.

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- e. Draft System Operational Concept (SOC) for the MAC Information Processing System (IPS), HQ MAC/SIP, 15 May 1985.

- f. MAC Mission Element Need Statement (MENS) for AFIRMS, MAC/DOC letter, 2 July 1985.
- g. Air Force Wide Mission Area Analysis (AFWMAA) Mission Area Analysis Decision Support System (MAA/DSS), Force Projection/Airlift/Load Movement Functional Description Working Draft, ANSER (for AF/X0XR), May 1985.
- h. USAF War Mobilization Plan, Volume 5, AF/XOXIC.
- i. MAC Unit Designed Operational Capability (DOC) Statements, AF/X00IM.
- j. Analysis of Military Airlift Command (MAC) Capability Assessment Metrics, SofTech, 30 September 1985.
- k. Strategic Air Command (SAC) AFIRMS Requirements Analysis, SofTech, 30 September 1985.
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1.5 Acronyms.

AAS	- Aeromedical Airlift Squadron
AAW	- Aeromedical Airlift Wing
AB	- Air Base
Acft	- Aircraft
ACL	- Allowable Cabin Load/Allowable Cargo Load
ADANS	- Airlift Deployment Analysis System
ADP	- Automated Data Processing
AES	- Aeromedical Evacuation Squadron
AF	- Air Force
AFB	- Air Force Base
AFIRMS	- Air Force Integrated Readiness Measurement System
AFLC	- Air Force Logistics Command
AFWIS	- Air Force WWMCCS Information System
AIMS	- Airlift Implementation and Monitoring System
ALCC	- Airlift Control Center
ALCE	- Airlift Control Element
ALD	- Airlift Division
APS	- Aerial Port Squadron
ARRS	- Aerospace Rescue and Recovery Squadron

ARRW - Aerospace Rescue and Recovery Wing
ATO - Air Tasking Order
AWS - Air Weather Service
C2 - Command and Control
CAMS - Consolidated Aircraft Maintenance Squadron
CAMS - Core Automated Maintenance System
CAT - Crisis Action Team
CATREP - Crisis Action Team Reports
CFMS - Combat Fuels Management System
CINC - Commander in Chief
COMALF - Commander for Airlift Forces
CONUS - Continental United States
CRAF - Civil Reserve Air Fleet
CSMS - Combat Supplies Management System
CSS - Combat Supplies System
DCS - Deputy Chief of Staff
Det - Detachment
DFCS - Deployment Flow Computer System
DOC - Designed Operational Capability
DoD - Department of Defense
FLOGEN - Flow Generator
HQ MAC - Headquarters, Military Airlift Command
HQ USAF - Headquarters, United States Air Force
HQ USAFE - Headquarters, United States Air Forces in Europe
ICAO - International Civil Aviation Organization
IPS - Information Processing System
JCS - Joint Chiefs of Staff
JDA - Joint Deployment Agency
LAN - Local Area Network
Log - Logistics
LPP - Learning Prototype Phase
LRC - Logistics Readiness Center
MAC - Military Airlift Command
MACAF - Military Airlift Command numbered Air Force
MAIRS - Military Air Integrated Reporting System
MAJCOM - Major Command

MAS - Military Airlift Squadron
MAW - Military Airlift Wing
MOG - Maximum on Ground
MX - Maintenance
NBC - Narrow Body CRAF
OPlan - Operations Plan
Ops - Operations
OSC - Operations Support Center
RWRW - Rescue and Weather Reconnaissance Wing
SAC - Strategic Air Command
SOF - Special Operations Forces
SITREP - Situation Report
Sq - Squadron
TAMS - Theatre Airlift Management System
TAW - Tactical Airlift Wing
UNITREP - United States and Identity Report
US - United States
USAFE - United States Air Forces in Europe
Ute - utilization (rate)
WBC - Wide Body CRAF
WMP - War Mobilization Plan
WOC - Wing Operations Center
WSMIS - Weapon System Management Information System
WWMCCS - Worldwide Military Command and Control System

SECTION 2. MAC ORGANIZATIONAL STRUCTURE

The mission of MAC is to operate, on a global basis, the MAC-assigned strategic and tactical airlift forces. MAC deploys, employs, and redeploys United States (US) combat units and their support equipment, and resupplies those units once in place. Additionally, MAC is responsible for special operations forces, presidential and aeromedical airlift, operational support airlift, rescue, and weather reconnaissance units.

MAC is geographically organized to accomplish the major missions of strategic and tactical airlift. Two numbered air forces are positioned on each coast with hemispheric responsibility for all airlift operations. Airlift divisions are located in the overseas theatres and given responsibility for tactical airlift operations in those theatre areas and to provide on-site management for the strategic airlift resources while in the theatre. Thus, each echelon at and above the Airlift Division (ALD) level is assigned responsibility for a specific geographic operating area. A more complete description of the airlift organization, responsibilities, and operational interfaces is in Appendix B.

To accomplish the missions of special operations, aeromedical airlift, rescue, and weather reconnaissance, MAC has another numbered air force with the global responsibility to manage the units that execute those missions.

The MAC headquarters and subordinate units and headquarters are described by their functional staff organization. Those organizations/agencies assessed to be users of AFIRMS readiness assessment data and dollars-to-readiness information are indicated with an asterisk (*) beside the office symbol. Except for the HQ MAC Surgeon General and Inspector General, no special staff agencies are AFIRMS users. (A more definitive list of AFIRMS users is contained in Section 3.4). Organizations or staff agencies that operate and maintain AFIRMS, such as HQ MAC/SI, do not use AFIRMS readiness information

and, thus, are not AFIRMS users. In addition, organizations or staff agencies that input data which is used by AFIRMS into other automated systems, (e.g., the MAC Information Processing System (IPS)), are not AFIRMS users. Some of the unit staffs are in the latter category.

2.1 Headquarters, Military Airlift Command (HQ MAC). HQ MAC is functionally organized under the deputy chief of staff (DCS) and special staff agency structure. Only the DCS agencies will be discussed. HQ MAC has nine functional DCS agencies of which six are AFIRMS users. The DSCs are:

OFFICE SYMBOL	STAFF AGENCY TITLE	STAFF FUNCTION
* MAC/DO	Operations	Current operations, C2, training, standardization/evaluation
* MAC/XO	Operations Plans	War planning, special operations
* MAC/XP	Plans	Programming, studies/analysis, manpower
* MAC/LG	Logistics	Maintenance, supply, logistics plans
MAC/SI	Information Systems	Data automation, communications
* MAC/TR	Air Transportation	Air transportation needs, aerial ports
MAC/AC	Comptroller	Budgeting & accounting of funds
MAC/DE	Engineering and Services	Civil engineering, special services
* MAC/DP	Personnel	Personnel management and planning
MAC/IN	Intelligence	Intelligence support and planning

* AFIRMS User DCSs. See Section 3.2.2.1

2.2 MAC Numbered Air Forces (21st, 22nd, and 23rd Air Forces). The MAC Numbered Air Forces (called MACAFs) are also functionally organized under the DCS and special staff agency structure. As with HQ MAC, only the DCS agencies will be discussed in this report. The Numbered Air Forces each have four DCS agencies though there is a difference between the airlift MACAFs (i.e., 21st, 22nd) and the non-airlift MACAF (i.e., 23rd). The airlift MACAFs have three DCSs that will use AFIRMS while 23rd Air Force has only two. The MACAF DCSs are:

<u>OFFICE SYMBOL</u>	<u>STAFF AGENCY TITLE</u>	<u>STAFF FUNCTION</u>
* DO	Operations	Current operations, C2, training, standardization/evaluation
* LG	Logistics	Maintenance, supply, logistics plans
*@ TR	Air Transportation	Air transportation needs, aerial ports
SI	Information Systems	Data automation, communications
# IN	Intelligence	Intelligence support and planning

@ 21st and 22nd Air Force only.

23rd Air Force only.

* AFIRMS User DCSs. See Section 3.2.2.2

2.3 MAC Airlift Divisions (ALDs) and COMALFs. MAC has an ALD in each of the two major theatres (i.e., Europe and Pacific) and Military Airlift Groups in the smaller theatres (i.e., Alaska, Panama). Their peacetime function is to provide a MAC interface with the theatre commands, control and task the theatre tactical airlift, and provide local control of the strategic airlift elements for the responsible MACAF. They also serve as a part of the theatre staff. For example, the 322nd Airlift Division in Europe is collocated at Ramstein Air Base, Germany with HQ USAFE and, in fact, serves as the USAFE DCS for Airlift. In exercises and crisis, the ALD commander becomes the theatre Commander for Airlift Forces (COMALF). As such, the COMALF's function is very similar to that of HQ MAC in receiving the cargo tasking from the theatre commander and generating a mission schedule for the theatre tactical airlift units. The COMALF still has the responsibility for providing local control and support for the strategic airlift elements.

Depending on the theatre size and the number of missions involved in a crisis or contingency, the COMALF may form subordinate Airlift Divisions each with a specific geographic area of responsibility. When formed, their function is very similar to that which the MACAFs perform for HQ MAC.

The MAC ALDs are functionally organized under the directorate and special staff agency structure. Again, only the directorate structure will be discussed. The ALD has three directors and all three are AFIRMS users (See Section 3.2.2.3):

<u>OFFICE SYMBOL</u>	<u>DIRECTOR TITLE</u>	<u>STAFF FUNCTION</u>
DO	Operations	Current operations, ops plans, ALCC
LG	Logistics	Maintenance, supply, log plans, LRC
TR	Air Transportation	Aerial port operations

2.4 MAC Airlift Flying Unit. The MAC airlift unit staffs are organized under the deputy commander and special staff agency structure. Only the deputy commander agencies will be discussed. The units have four deputy commanders, two of which are AFIRMS users. The remaining two deputy commanders will be served by MAC's Information Processing System (IPS) and AFIRMS will extract their data input from IPS. Thus, the MA and TR do not qualify as AFIRMS users.

<u>OFFICE SYMBOL</u>	<u>DEPUTY COMMANDER</u>	<u>STAFF FUNCTION</u>
* DO	Operations	Current ops, ops plans, WOC, squadrons
MA	Maintenance	Maintenance, log plans, LRC
TR	Air Transportation	Aerial port operations
* RM	Resource Management	Supply, fuels, ground transportation

* AFIRMS users. See Section 3.2.2.4

2.5 MAC Airlift Support Units. The organizational structure of a MAC airlift support unit (wing, group, or squadron) varies according to its location and mission. However, each support unit always has a consolidated aircraft maintenance squadron (CAMS) and an aerial port squadron (APS). Additionally, if the support unit is located on a base that MAC owns, it will have a deputy commander for resources as well as a special staff. Occasionally, it may also have flying squadrons that operate support aircraft such as the C-12, C-21.

and C-23. As with the airlift flying unit, the non-AFIRMS users are served by MAC's IPS and will not need AFIRMS. These organizations are:

<u>OFFICE SYMBOL</u>	<u>SQUADRON/DEPUTY CMDR</u>	<u>SQUADRON/STAFF FUNCTION</u>
@ MAS	Military Airlift Sq	Flying operations
CAMS	Consolidated Acft Mx Sq	Maintenance operations
APS	Aerial Port Squadron	Aerial port operations
*# RM	Resource Management	Supply, fuels, ground transportation

@ This function exists for those few Airlift Groups that have support aircraft (e.g., 608th Military Airlift Group at Ramstein Air Base).

This function exists for Support wings that also own the base (e.g., 1605th Military Airlift Support Wing at Lajes Air Base).

* AFIRMS user.

2.6 375th Aeromedical Airlift Wing (375 AAW). The 375 AAW is organized under the deputy commander and special staff agency structure. Only the four deputy commander staffs will be shown. All four deputy commander staffs are AFIRMS users.

<u>OFFICE SYMBOL</u>	<u>DEPUTY COMMANDER</u>	<u>STAFF FUNCTION</u>
DO	Operations	Operational support airlift operations, aeromedical airlift operations, wing command post, operations plans, operational control of worldwide aeromedical airlift units
AS	Aeromedical Services	Worldwide air evacuation manager, responsible for movement of all patients in the air evacuation system, supervises all air evacuation units
MA	Maintenance	Maintenance, logistics plans, job control
RM	Resource Management	Supply, fuels, LRC

The wing has three missions: Operational support airlift in the continental United States (CONUS), aeromedical airlift in the CONUS, and operation of a worldwide aeromedical evacuation system. The units of the 375 AAW are stationed at 16 CONUS locations and 2 overseas locations. All units are anticipated to be AFIRMS users.

11 Aeromedical Airlift Squadron (AAS) at Scott AFB, IL
20 AAS at Clark AB, Philippines
55 AAS at Rhein-Main AB, Germany
1400 Military Airlift Squadron (MAS) at Norton AFB, CA
with 4 detachments
1401 MAS at Scott AFB, IL with 4 detachments
1402 MAS at Andrews AFB, MD with 4 detachments
1 Air Evacuation Squadron (AES) at Pope AFB, NC
2 AES at Rhein-Main AB, Germany
9 AES at Clark AB, Philippines
57 AES at Scott AFB, IL

2.7 2nd Air Division (2AD). The 2nd Air Division is organized as directorates and special staff agencies. Only the four directorates will be shown. Only three of the four directorates are AFIRMS users.

<u>OFFICE SYMBOL</u>	<u>DEPUTY COMMANDER</u>	<u>STAFF FUNCTION</u>
* DO	Operations	Current operations, operations plans
IN	Intelligence	Intelligence
* LG	Logistics Plans	Logistics planning
* XP	Plans	Contingency planning

* AFIRMS Users.

The 2AD has one mission: special operations. Its units are stationed at one CONUS location and three overseas locations. All units are anticipated to be AFIRMS users.

1 Special Operations Wing at Hurlburt AFB, FL
with DO, MA, and RM deputy commander AFIRMS users
1 Special Operations Squadron at Clark AB, Philippines
7 Special Operations Squadron at Rhein-Main AB, Germany
Det 1, 2AD at Howard AFB, Panama Canal Zone

2.8 Air Rescue & Recovery Wing/Rescue & Weather Reconnaissance Wing

(ARRW/RWRW). The 39 ARRW and the 41 RWRW are organized under the deputy commander and special staff agency structure. Both of the deputy commanders are AFIRMS users.

OFFICE SYMBOL	DEPUTY COMMANDER	STAFF FUNCTION
DO	Operations	Current operations, operations plans
MA	Maintenance	Aircraft maintenance, logistics plans

The 39 ARRW has only the air rescue mission while the 41 RWRW has both air rescue and weather reconnaissance missions. The 39 ARRW units are stationed at 24 CONUS locations and 4 overseas locations. The 41 RWRW units are stationed at 3 CONUS locations and 7 overseas locations (including Alaska). Some of the CONUS units have a deployment mission. All units are AFIRMS users.

39 ARRW at Eglin AFB, FL with 3 detachments
37 ARRS at FE Warren AFB, WY with 10 detachments
40 ARRS at Hill AFB, UT with 7 detachments
55 ARRS at Eglin AFB, FL
67 ARRS at RAF Woodbridge, UK with 3 detachments

41 RWRW at McClellan AFB, CA with 2 overseas detachments
31 ARRS at Clark AB, Philippines
33 ARRS at Kadena AB, Japan
38 ARRS at Osan AB, Korea
41 ARRS at McClellan AFB, CA
53 WRS at Keesler AFB, MS
54 WRS at Anderson AFB, Guam
55 WRS at McClellan AFB, CA
71 ARRS at Elmendorf AFB, AK

SECTION 3. MAC AFIRMS INFORMATION REQUIREMENTS

3.1 AFIRMS Information Requirements. In assessing combat capability against specific taskings or specific dollar amounts, AFIRMS utilizes several types of information.

- a. Tasking and Resource Information. Much of the data needed by AFIRMS can be provided by several MAC command and control support systems. The Information Processing System (IPS) discussed in Section 5.2.1.1 will combine some of those systems and, thus, greatly improve the accessibility of data by reducing the number of MAC systems that AFIRMS will interface with. AFIRMS will still need to interface with other Air Force automated systems to obtain data outside of the MAC IPS (such as fuels and resupply information). Tasking and resource information that AFIRMS will need includes:
 - (1) Tasking data, such as WMPs, OPLANS, ATOS, frags, mission schedules, etc.
 - (2) Summarized resource status information (e.g., aircraft status to include spares and maintenance factors). To obtain summarized resource data, AFIRMS sometimes must collect detailed resource data. When ADP systems such as the MAC IPS collects summarized resource data, AFIRMS does not need the detailed resource data if the summarized information can be obtained from IPS.
 - (3) Unit readiness information needed by commanders and other users at all command levels (e.g., identification of resource shortfalls, critical conditions, and/or limiting factors).
- b. Dollars-to-Readiness Information. Dollars-to-readiness source data is entered by the user and generated by the AFIRMS Sortie Generation Model. The data entered by the user is essentially unit pricing data. The AFIRMS generated data is the capability data (e.g., tasked and shortfall resource quantities, etc.) provided by the AFIRMS capability assessments and the readiness costing data that is the result of multiplying the unit pricing and tasked/shortfall quantities. Dollars-to-readiness information is needed to:
 - (1) Determine the level of funding necessary to achieve and maintain the desired levels of readiness and sustainability.
 - (2) Determine levels of readiness and sustainability that can be achieved with a given funding level.
 - (3) Demonstrate whether readiness and/or sustainability actually change given the increase/decrease of funding.

- c. Notional Information. Hypothetical data is entered by the user and stored in the AFIRMS database for future use. Notional data may be resource status data, tasking data, dollars-to-readiness data, and/or historical data. It is needed for "what-if" queries and forecasting purposes such as:
 - (1) Relating changes in funding to changes in force readiness and sustainability for budgetary exercises.
 - (2) Assessing alternative proposals for allocation of resources or assignments of tasking.
- d. Historical Information. AFIRMS maintains its own historical database. Historical data is used to:
 - (1) Compute long-term readiness and sustainability trends (spanning two to five fiscal years).
 - (2) To track, recognize, report, and project trends in readiness and sustainability.

3.2 MAC User Information Needs. The information needs for the MAC users will, of course, vary by the command echelon and the job or function of the user. The following section will discuss the information needs by command echelon. Within this frame of reference, the specific users or offices within each command echelon who are expected to use AFIRMS are identified. This user identification is based on the interviews conducted at HQ MAC, HQ 21st and 23rd Air Forces, the 438th MAW, the 314th TAW, and the 375th AAW.

3.2.1 Information Needs by Command Echelon. There is no single system for assessing or reporting capability within MAC or the Air Force today. However, several MAC and Air Force systems and reports do provide information to MAC that relates to capability. MAC's major sources of capability-related information are the Combat Readiness Reporting System and the MAC Operational Reporting System (MACR 55-16, Vol I). The Unit Status and Identity Report (UNITREP) is the best known report from the Combat Readiness Reporting System. The Crisis Action Team Reports (CATREP), Commander's Situation Report (SITREP) and the Aircrew Location Report are the primary reports providing capability types of information from the MAC Operational Reporting System.

Capability information is basically upward-directed, in advance of, or in response to, downward directed requirements and tasking. This means that the upward-directed nature of capability assessment is a dynamic, constantly changing process. In view of the upward-directed nature of capability assessment, discussion of capability information requirements will start with the unit and Airlift Control Element (ALCE) echelon level. Also, those echelons with similar information needs and echelon functions (a more complete description of each echelon is contained in Appendix B) are paired to emphasize their similarity. Figure 3-1 depicts the typical airlift command and control structure with the functions performed by each echelon. For example, ALDs and MACAFs have very similar information requirements; differences exist primarily due to geographic area responsibility.

MAC has a twofold need for capability information:

- a. To make resource allocation decisions. A capability assessment system should not determine the resources needed for mission support; rather, it should provide information that will support the users in making the resource allocation decisions.
- b. To monitor, direct, and control unit missions. However, specific capability needs vary by command echelon, both in purpose and detail.

3.2.1.1 Unit/ALCE Capability Information Requirements. The unit/ALCE needs capability information to:

- a. Provide the controlling MACAF or ALD with present and projected workload capacity.
- b. Determine its ability to support assigned missions as scheduled.
- c. Request additional resources when scheduled workload exceeds capacity.
- d. Provide additional resources if requested, when scheduled workload is, or will be, less than planned capacity.
- e. Provide higher headquarters and unit/ALCE commanders with the assessments of unit/ALCE performance.

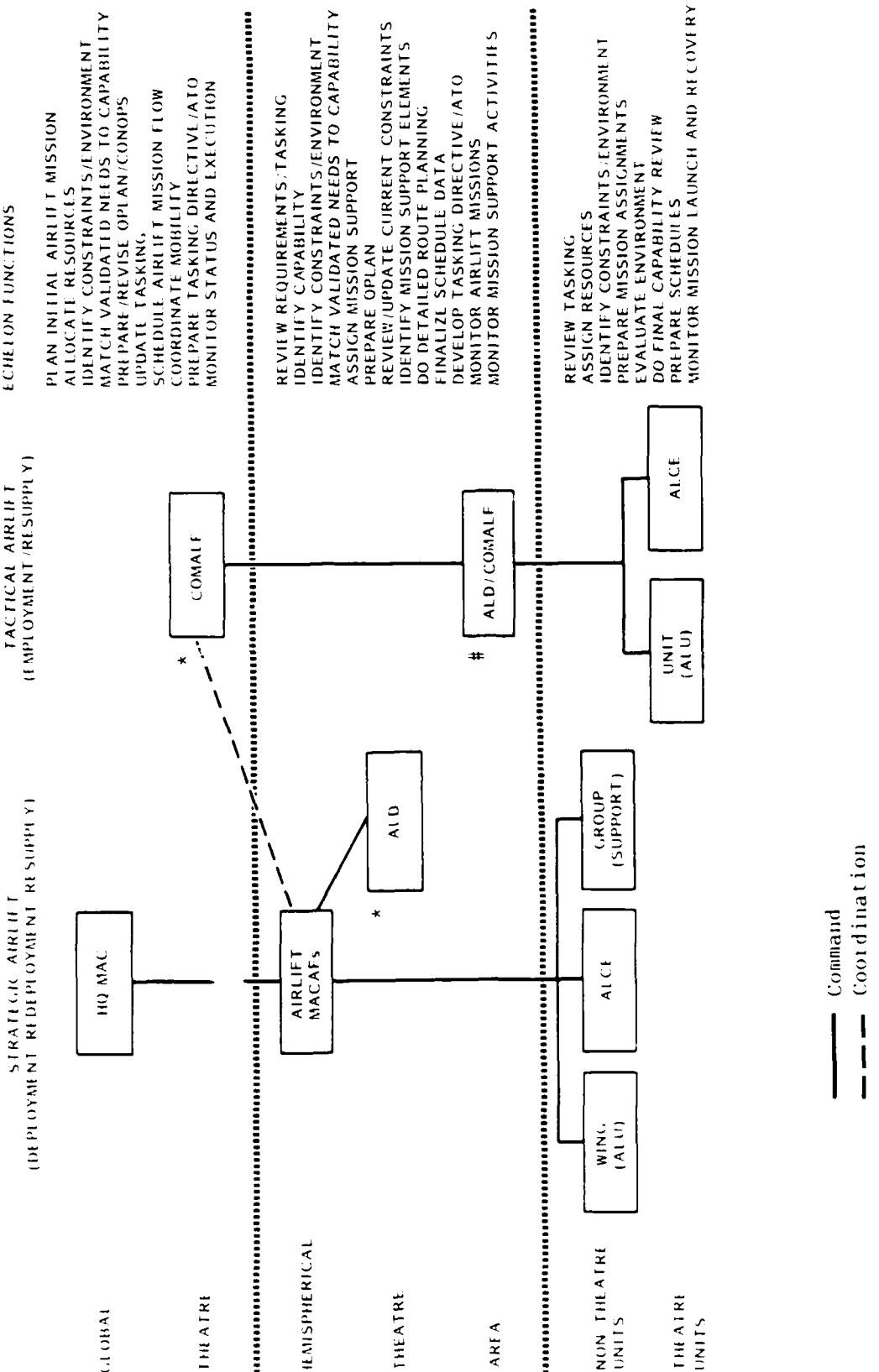


Figure 3-1. Typical Command & Control Structure and Functions Performed by Each Echelon

3.2.1.2 MACAF and ALD Capability Information Requirements. MACAFs and ALD need capability information to:

- a. Provide HQ MAC/COMALF its present and projected ability to perform missions.
- b. Create a detailed inter/intratheatre mission schedule from an airlift flow plan that can be performed within the limits (inherent design) of assigned and available resources.
- c. Determine a need to change a mission schedule.
- d. Determine mission diversion options and recommendations.
- e. Request resource relocation authority from HQ MAC/COMALF for assigned resources.
- f. Request additional resources from HQ MAC/COMALF to meet shortfalls of mission aircraft and/or mission support requirements (personnel and equipment).

3.2.1.3 HQ MAC and COMALF Capability Information Requirements.

- a. HQ MAC needs capability information to:
 - (1) Assess the pre-deployment capability of MAC and MAC-gained deployable units.
 - (2) Assess the ability to support the present and projected strategic (intertheatre) airlift requirements.
 - (3) Determine the post-attack capability of MAC strategic forces and their reconstitutability.
 - (4) Create an intertheatre airlift flow plan.
 - (5) Request additional CRAF resources (personnel and materiel) to meet MAC-internal shortfalls of mission aircraft and mission support personnel and equipment.
 - (6) Allocate MAC resources between numbered air forces (MACAFs).
 - (7) Request mission support (spares, depot resources) from the Air Force Logistics Command (AFLC).

b. COMALF needs capability information to:

- (1) Provide MACAFs and supported CINCs with present and projected ability to support theatre airlift requirements.
- (2) Request augmentation resources from the MACAFs and the theatre Commander to meet shortfalls of mission aircraft and/or mission support personnel and equipment.
- (3) Create a tactical (theatre) airlift flow plan.
- (4) Allocate (relocate) assigned resources within the theatre.

3.2.2 MAC AFIRMS Users. Based on the interviews of 111 MAC personnel, the MAC offices identified below are the probable users of AFIRMS. The list of users is as exhaustive as the study's time and resources permitted. Follow on analysis efforts may identify other users of AFIRMS. In order not to prejudice such analysis, those staff elements that were judged not to be AFIRMS users are not identified in this report. The AFIRMS users are not identified on the basis of a need for readiness and/or capability assessment data. The need for inventory type information which could be provided by other automated systems did not qualify (in our estimation) an organization as an AFIRMS user. Likewise, organizations which may be the source of AFIRMS data are not necessarily AFIRMS users. For example, if the unit maintenance input aircraft status data into IPS, AFIRMS' use of the aircraft data does not qualify the unit maintenance as an AFIRMS user. Thus, the AFIRMS users identified below are those with a need for capability and/or readiness type information which could not be provided by current or planned MAC and Air Force systems.

3.2.2.1 HQ MAC AFIRMS Users. At HQ MAC, the following offices were identified as AFIRMS users.

<u>OFFICE SYMBOL</u>	<u>OFFICE FUNCTION</u>
DOCR	Operational reports including UNITREP
DOOM	Airlift operations; develops mission flow
DOOS	Special operations and other non-airlift operations
DOOX	Contingency and exercise management; also develops mission flow
* D00A	DOC statements; coordinates DO POM inputs; provides ADP support
* D00F	Operational support airlift planning
XOX	Combat operations planning
XPPB	Planning, programming, and budgeting system
XPSS	Analytical studies and plans analysis/assessments
LGSF	Fuels planning and programming/budgeting
* LGSS	Spares planning and programming/budgeting
LGXW	Logistics war plans
SGRX	Aeromedical readiness and planning
CAT	Crisis Action Team; composite of MAC staff to handle crisis
* IGI	Operational readiness inspections
* DPX	Personnel contingency planning and programming
TRXP	Air transportation planning

* Unable to interview but appear to be AFIRMS users.

3.2.2.2 MACAF AFIRMS Users.

a. HQ 21st & 22nd Air Force

<u>OFFICE SYMBOL</u>	<u>OFFICE FUNCTION</u>
CAT	Crisis Action Team; composite of MACAF staff
DOC	UNITREP, operational reports, command/control
DOXC	Operations contingency & exercise plans
DOOM	Airlift management
TRX	Air transportation plans and resource management
* LGRX	Logistics planning

* Unable to interview, but appear to be a AFIRMS user.

b. HQ 23rd Air Force

<u>OFFICE SYMBOL</u>	<u>OFFICE FUNCTION</u>
CAT	Crisis Action Team; composite of MACAF staff
DOC	UNITREP, operational reports, command/control
DOXC	Combat plans
DOOJ	Contingency operations and special operations
DOOM	Missions management
LGX	Logistics planning and budget programming

3.2.2.3 ALD & COMALF AFIRMS Users. There are only two ALDs in MAC--the 322nd ALD at Ramstein AB, Germany and the 834th ALD in Hickam AFB, Hawaii. Both also serve as the Commander of Airlift Forces (COMALF) for their theatres. While no ALD personnel were interviewed during this study, the European Airlift Support Center (OSC) during the WINTEX command post exercise in March 1985.

<u>OFFICE SYMBOL</u>	<u>OFFICE FUNCTION</u>
* DOX	Operations planning
* D00	Develops mission flow/schedule for units
ALCC	Airlift control center
* LGX	Logistics planning
* APCC	Aerial port control center;

* Unable to interview, but appear to be AFIRMS users.

3.2.2.4 Unit/Wing Level AFIRMS Users. The study effort did not include interviews for all of the several types of wings/units in MAC. Consequently, only the airlift wing AFIRMS users are listed below. This user list applies explicitly to the active duty units only. However, the reserve forces organization should be very similar if not identical. Follow on analysis should identify the AFIRMS users for the Special Operations, Air Rescue, Weather Reconnaissance, Aeromedical Airlift, Operational Support Airlift, and airlift support units. However, those units are expected to have similar functions requiring use of AFIRMS.

Military/Tactical Airlift Wings/Groups (MAW/MAG, TAW/TAG)

<u>OFFICE SYMBOL</u>	<u>OFFICE FUNCTION</u>
CAT	Crisis Action Team; composite of wing/group staff
DOO	Current operations; completes wing/group mission schedule
DOC	Command/Control, UNITREP, operational reports
DOX	Operations and support planning
LGSF	Fuels resource data, fuels operations
LGSC	Supply resource data
* TAS	Tactical airlift squadron (deployable)

* Unable to interview but needs to be an AFIRMS user for independent deployed operations.

3.3 Information Flow Between HQ USAF and HQ MAC. The flow of AFIRMS information between HQ USAF and HQ MAC is a two-way flow. However, with the current AFIRMS "push" architecture, the flow from HQ USAF is limited to message-type information passed via an electronic mail utility program. On the other hand, the flow of database information from HQ MAC to HQ USAF is pushed up to update the HQ USAF database. HQ MAC can also send messages via an electronic mail utility program. (This electronic mail utility will be available to users at all echelons.)

3.3.1 The Information Flow from HQ USAF to HQ MAC. The downward information flow from HQ USAF to HQ MAC should not be any different than the HQ USAF flow to the other MAJCOMs. HQ USAF will not be able to query the HQ MAC AFIRMS database nor any other MAJCOM's AFIRMS database. The HQ USAF information flow to HQ MAC will be limited to what it can send through the electronic mail. HQ USAF can provide HQ MAC with (or inquire about) information concerning unit tasking (e.g., OPlan, DOC statement, ad hoc, etc.), dollars-to-readiness, capability assessments, and resource/unit status.

- a. Tasking information. HQ USAF can manually input unit tasking data into its AFIRMS database or it can pass the task parameters to HQ MAC for construction of the tasking and assessment of the capability to accomplish the task. The purpose of the task could be for

hypothetical, OPlan, UNITREP, crisis, or budgetary scenarios. Additionally, HQ USAF may pass a hypothetical cargo tasking to HQ MAC for development of a mission flow of the task. (Because the mission flow is a slow process, MAC currently receives very few, if any, requests to flow hypothetical tasking. Consequently, the implementation of AFIRMS should not cause an increase in the number of such requests.)

- b. Dollars-to-Readiness information. HQ USAF can send unit pricing data, resource tasking and shortfall data, and/or other dollars-to-readiness information to HQ MAC for the commander's situation reports, MAC budget preparations, etc.
- c. Capability assessment information. HQ USAF can send information about unit/force capability assessments that need HQ MAC analysis to answer questions, solve resource shortfalls (e.g., reallocation), or change tasking.
- d. Resource and unit status information. HQ USAF may request information about the status of MAC resources and/or units.

3.3.2 The Information Flow from HQ MAC to HQ USAF. Like the downward flow, the upward flow of information from HQ MAC to HQ USAF should not be any different for MAC than the information flow of the other MAJCOMs. HQ MAC will not be able to query the HQ USAF AFIRMS database (nor any other MAJCOM's or wing's database). The HQ MAC information flow to HQ USAF will be limited to the programmed database updates and information MAC can send through the electronic mail. HQ MAC database updates will provide HQ USAF with updated information about unit tasking, capability assessments, resource/unit status, dollars-to-readiness, and historical trends.

- a. Tasking data. HQ MAC will update the unit tasking data for OPlans, DOC statements, "ad hoc" tasking, crisis taskings, and other tasking as may be needed. Additionally, as HQ USAF has no airlift mission flow generator, HQ MAC may construct an airlift mission flow tasking for HQ USAF, as necessary, for long-term planning and "what if" assessment purposes.

- b. Capability assessment data. HQ MAC will update the HQ USAF database with unit and MAJCOM capabilities for OPlan, WMP/DOC statement, crisis, ad hoc "what-if", and budgetary taskings. Such assessments may or may not include the reserve forces or the Civil Reserve Air Fleet (CRAF) (Only HQ MAC will be able to assess the CRAF's capability). HQ MAC will also send data on any resource shortfalls that will act as a constraint on MAC unit capabilities and MAC's airlift capability.
- c. Resource and unit status data. HQ MAC will periodically update the HQ USAF database with detailed data on the status of MAC units and resources. During exercises and wartime, HQ MAC will also update the operational status of MAC bases.
- d. Dollars-to-Readiness data. HQ MAC will provide information and capability assessment data to support HQ USAF's budgeting and programming exercises.
- e. Historical data. HQ MAC will send to HQ USAF any historical or trend data necessary to assist HQ USAF in long-term planning and budgeting, and in making "what if" capability assessments.

3.4 New Data Requirements. Due to the inherent differences between the tactical fighter mission (multiple aircraft; one sortie each) and the MAC airlift mission (one aircraft; multiple sorties), there are some differences in AFIRMS data requirements between the tactical fighter units and airlift units. Some of the data will be input by the user (e.g., aircrew mission qualification, ICAO code, parking MOG, etc.) and stored in the AFIRMS database. AFIRMS will compute some of the required data from unit resource data (e.g., servicing MOG, cargo handling MOG, etc.). The data listed below is only a partial compilation of the data that is needed by MAC AFIRMS. In addition, that data already tabulated in the AFIRMS Data Requirements Document (reference 1 in Section 1.4) is not repeated here.

New data items required for MAC AFIRMS algorithms include the following:

- a. Aircrew Data. AFIRMS needs more information on aircrew qualifications, e.g., whether or not the aircrews are airdrop, airland, Special Operations Low Level qualified, or any other mission qualifications.

- b. Aerial Port Data. AFIRMS needs information regarding the current status of:
 - (1) Material handling equipment, e.g., forklifts, K-loaders, etc.
 - (2) Material handling personnel.
 - (3) Maintenance personnel.
 - (4) Aerial port limitations, e.g., MOG (maximum on ground) data, quiet hours, etc.
- c. Airfield Data. AFIRMS will need additional information about the airfield. Some of the needed data will be:
 - (1) Airfield International Civil Aviation Organization (ICAO) code, e.g., ICAO code for Travis AFB, CA is "KSUU."
 - (2) Airfield capacity expressed as a Maximum on Ground (MOG). The MOG is defined by type of airlift aircraft (i.e., C-5/WBC, C-141/NBC, C-130), by purpose of MOG, (e.g., aircraft parking, aircraft servicing, palletized cargo handling, etc.), and by scenario (i.e., peacetime, crisis). For example, an airfield may be able to park 5 C-5 or wide body CRAF (WBC) aircraft, service 4 C-5/WBC, and load 3 C-5/WBC during peacetime but, for a crisis or contingency scenario, it may be able to handle twice the number of aircraft indicated for peacetime.
- d. Mission Data. AFIRMS will need more mission tasking data than is currently collected.
 - (1) Takeoff and landing dates.
 - (2) Aircraft type(s) or MDS(s).
 - (3) Sortie departure and arrival locations.
 - (4) Sortie purposes, e.g., enroute, refuel, crew change, crew rest, onload, offload, positioning, repositioning, etc. In other words, the reasons for landing at the sortie destination (arrival location).
 - (5) Cabin load details, i.e., number of passengers, short tons of cargo, and whether it is organic or palletized cargo.
 - (6) Tasked aircraft configuration code.
- e. Munitions Data. MAC will not need munitions data for most of its units with the exception being the Special Operations units.

3.5 New Algorithms and/or Algorithm Changes. The addition of MAC and the airlift mission to the AFIRMS will require that some changes be made to the AFIRMS algorithms. Three changes to the AFIRMS model are needed if the airlift mission is to be served as well as the tactical fighter mission. The changes will be in the tasking, the metric used to measure readiness and sustainability (i.e., combat capability), and the constraints on the missions.

Before discussing those algorithm changes, the "mission" needs to be defined. The term "mission" has two meanings in the Air Force and in this report. The mission as an AFIRMS metric uses the second definition.

- (1) An operational or specialized task categorized by objective (e.g., Airlift, Close Air Support, Special Operations, etc.) and/or perspective (i.e., strategic, tactical).
- (2) The mission is also the dispatching of one or more aircraft to accomplish one particular task. An aircraft dispatched on a mission may fly one or more sorties; each sorties may be one or more hours in duration.

3.5.1 Tasking Algorithm Changes. The LPP algorithms considered only the fighter tasking on a sortie basis rather than on a mission basis. The operational AFIRMS will consider the fighter tasking on both a mission and a sortie basis in order to accommodate the MAC airlift mission. Fighter missions almost always consist of one sortie for each mission aircraft; each mission typically has two or more aircraft. Additionally, the fighter typically returns to its base of departure at the end of the sortie and does not stop enroute. Further, on the few occasions when it does not recover at its departure base, the aircraft launches from the recovery base on a new mission and normally recovers at its original departure base. Thus, for assessment modeling purposes, it is reasonable to assume that each fighter aircraft flies one sortie per mission and always recovers at its home base.

However, an airlift mission (strategic, tactical, aeromedical, or operational support) may consist of several sorties, most of which are flown from and/or recovered at bases other than its home base. Additionally, the missions typically consist of only one aircraft. An airlift mission may have three categories of sorties: positioning, enroute, and repositioning sorties.

- a. Positioning sortie. If the mission aircraft must fly from its home base to the first onload point, the mission will include that positioning sortie.
- b. Enroute sortie. There will be one or more sorties enroute from the first onload point to destination.
- c. Repositioning sortie. The mission may also include sorties at the end of the mission to reposition the aircraft for the next mission. (However, if the mission destination is also the onload point for the next mission, the repositioning sortie does not apply). The repositioning sortie(s) are necessary to:
 - (1) fly the aircraft back to home base if there are no more missions, or
 - (2) reposition the aircraft at the first onload point for the next mission, or
 - (3) fly the aircraft to a recovery base for refueling and/or an aircrew change before performing (1) or (2) above, as necessary.

AFIRMS will not need to determine how many sorties are in an airlift mission because the airlift mission flow tasking received by AFIRMS (and provided by HQ MAC as shown in the example in attachment 1) will include all of the sorties required for the mission. However, AFIRMS will assess the capability to complete all of the mission's sorties before determining that the mission is "doable." If one of those sorties can not be accomplished, the mission will be considered as "not doable."

The other MAC unit missions (special operations, air rescue, and weather reconnaissance) have one or more aircraft per mission and one or more sorties per aircraft. The typical profile, however, is one aircraft and one sortie as with the fighter unit mission.

Thus, the AFIRMS tasking module and assessment algorithms must be capable of accepting multiple aircraft per mission and multiple sorties per aircraft.

3.5.2 MAC Capability Assessment Metrics. The current LPP fighter metric of sorties will be retained and new metrics will be introduced to measure fighter and airlift unit capability. The new metrics are mission, flying hours, and ton-miles (airlift only). These new metrics will provide AFIRMS-assessment flexibility and provide compatibility between the weapon system evaluations. For information on these metrics, refer to the Analysis of MAC Capability Assessment Metrics report (reference j in Section 1.4).

The status of the resources at each MAC base must be updated daily in AFIRMS (and/or IPS). Resources updated include aircraft, aircrews, ground crews and equipment, fuels, and spares. These are converted for each unit and/or base into an estimated capability to complete/support some number of missions. The output of each capability assessment will be expressed as missions, sorties, and flying hours. Additional algorithms are needed for AFIRMS to express the results in ton-miles.

3.5.3 Mission Constraints. The model of the constraints on a MAC mission are more complex than the present AFIRMS model can accommodate. Three general types of constraints are contemplated--those for the mission's point of departure or origin, those for enroute stops, and those for the destination.

- a. **Base of Departure.** At the base of departure or mission origin, MAC capability will be limited by base and unit resources, as the fighter sorties/missions are now, e.g., availability of mission capable aircraft, aircrews, and fuels. Munitions availability data is not replaced, but the system must know whether or not to include munitions. Aerial port (or Airlift Control Element (ALCE)) resources are included as a mission constraining resource. Again, the system will need to know when this is applicable.
- b. **Enroute Servicing.** The principal enroute constraints will be availability of fuel servicing, stage aircrews, and parking limitations. Other factors, such as maintenance repair capability, will be included. Base support items, such as billeting and dining facilities, are assumed to be available and will not be included in the model.

- c. Destination. Destination bases will be constrained by the availability of materials handling equipment (MHE) and parking limitations. Requirements for aircraft servicing, aircrews, aircraft maintenance, etc., will also be constraining if the destination base is also designated as a recovery base.

SECTION 4. MAC AFIRMS ADP REQUIREMENTS

MAC currently has approximately 100 Automated Data Processing (ADP) systems. Most of these systems have problems associated with hardware, program modules, saturated and outdated telecommunications lines, or system designs that are lacking in functionality and flexibility. To manage its ADP requirements, MAC has developed a comprehensive outline for the evolutionary development of ADP and Communications-Electronics capabilities over the next 10 years (1987-1996). This effort has resulted in a need to combine system data collection efforts, where possible, and to critically analyze future system integration requirements.

4.1 The Need for Integration of Systems. The Air Force has seen the development and implementation of a number of "stovepipe" systems that serve the automated needs of a particular user. These "stovepipe" systems were developed without considering future expansion or integration with other functional systems. Thus, integration among like systems is virtually impossible. Therefore, one issue that MAC and AFIRMS must address early is that of system integration between existing systems and future systems.

Clearly, ADP systems must be designed to capture data only once and disseminate this data to all other systems requiring its use. It is the AFIRMS concept that, whenever possible, data that has already been collected or computed will be used in the calculations of capability assessment. Therefore, AFIRMS will interface with existing as well as future systems where possible and applicable.

4.2 AFIRMS Interfaces with MAC Unique ADP Systems. Several MAC ADP systems have been identified as systems which contain information that can be used by AFIRMS. The systems are:

- a. AIMS (Airlift Implementation and Monitoring System) - automated data system to support the operation and management of the active duty MAC airlift force. Additionally, the system is intended to support the MAC transportation organizations worldwide with current aircraft

schedule and movement information. This system will become a part of the MAC IPS. Once implemented, AFIRMS will obtain any needed data through its IPS interface.

Hardware - AIMS is implemented on a Honeywell 6000 computer.

Data - AIMS contains unit tasking/schedule information for all active or proposed missions.

Users - The primary users of AIMS are the current operations and operations center personnel at HQ MAC, MACAFs, the airlift wings, and overseas locations.

- b. MAIRS (Military Air Integrated Reporting System) - system to provide accurate reporting of mission movement to ensure effective command and control of active duty units. The reporting system is designed to provide HQ MAC with the basic data to assist in effectively managing forces; provide MAC wings with the information required to flight follow their aircraft; enable the theatre ALCCs and overseas RCC/JRCC to flight follow aircraft in their areas; and provide enroute stations with prior notification of arrival and departure of aircraft so they can plan for and provide the required service. This system will become a part of the MAC IPS. Once implemented, AFIRMS will obtain any needed data through an IPS interface.

Hardware - MAIRS is implemented on a Honeywell 6000 computer.

Data - MAIRS contains the status of off base aircraft.

Users - The primary users of MAIRS are the LRCs, current operations, and operations center personnel at HQ MAC, the MACAFs, and the airlift wings.

- c. IPS (Information Processing System) - a proposed network of automated support capabilities designed to aid MAC personnel in performing the command and control functions associated with the execution planning, scheduling, and execution of MAC's airlift mission. When IPS is implemented, it will subsume AIMS and MAIRS and interface with FLOGEN/ADANS. Additionally, the IPS will include the MAC-gained Air National Guard (ANG) and Air Force Reserve (AFRES) airlift units. (See Section 5.2.1.1 for a description of IPS).

Hardware - A final decision has not been made, however, the testbed system used networks of IBM PCs.

Data - IPS will contain resource status and mission tasking information.

Users - The primary users of IPS will be current operations and operations center personnel at HQ MAC, MACAFs, and the airlift wings. Support will also be provided at the following command echelons: COMALF/ALD, ALCE and the Airlift Unit. In addition, the IPS will provide support to the Air Transportation (TR), Logistics (LG), Intelligence (IN), and Weather (WX) organizations.

- d. FLOGEN III (Flow Generator, Version 3) - mission flow generator used by MAC to schedule the cargo tasking for operations plans (OPlans) and large exercises.

Hardware - FLOGEN is implemented at HQ MAC on a Honeywell 6000 computer at HQ MAC.

Data - FLOGEN contains the cargo and passenger requirements, scheduled mission data, and unit tasking schedules.

Users - FLOGEN system is used primarily by D00 and the CAT at HQ MAC.

- e. ADANS (Airlift Deployment Analysis System) - replacement for FLOGEN III

Hardware - ADANS will be implemented at HQ MAC on a deployment flow computer system (DFCS) hardware that is yet to be determined.

Data - ADANS will contain the cargo and passenger requirements, scheduled mission data, and unit tasking schedules.

Users - ADANS will be used primarily by D00 and the CAT at HQ MAC.

- f. TAMS (Theatre Airlift Management Systems) - mission flow (scheduling) and tracking system that is used by the theatre ALD/COMALF.

Hardware - TAMS will be implemented on the Zenith Z-150.

Data - Scheduling and status information of aircraft.

Users - TAMS will be used primarily by the ALD/COMALF.

4.3 MAC ADP System Changes to Accommodate AFIRMS. AFIRMS needs to interface with those ADP systems that contain data required to perform capability assessments. This may necessitate changes to some of MAC's current or future systems. Based on the discussion of the IPS in Section 5.2.1, it is recommended that AFIRMS be implemented in conjunction with, or subsequent to, installation of the IPS. If this approach is taken (assuming that an

IPS-AFIRMS interface is designed and implemented), modifying MAC ADP systems to accommodate AFIRMS will be a much easier task.

In Section 5.2.2, two basic implementation options are presented for a MAC AFIRMS; (a) include AFIRMS as processor node in the IPS Local Area Network (LAN) or (b) interface a separate AFIRMS system with the IPS for data collection purposes.

Regardless of the implementation option selected, some data collection external to the IPS will be needed as discussed in Section 3.1. If AFIRMS is hosted in the IPS network, it will have access to much of the necessary data via the IPS database. If, however, option (b) is chosen, AFIRMS will need communication links to selected external ADP systems, as well as a communication link to the IPS. It is not yet clear whether or not IPS will collect data on non-aircrew personnel, fuels, and aircraft spares resources. This data is necessary in the AFIRMS calculation of capability assessment, and must therefore be obtained from other sources if the IPS does not collect it.

SECTION 5. RECOMMENDATIONS

5.1 AFIRMS Implementation Concerns.

5.1.1 Multiplicity of Deployable ADP Systems. Several deployable ADP systems are currently being designed, planned, and procured by HQ MAC and the Air Force. They are:

- a. Combat Supply System (CSS) - The CSS is the first major Air Force combat logistics ADP system to be deployable. It is a small transportable computer ADP system designed to deploy with, and provide direct supply support to, combat forces. CSS functions as an extension of the Standard Base Supply System (SBSS) to perform wartime essential processes at deployed locations.
- b. Core Automated Maintenance System (CAMS) - CAMS/CMS (now CAMS/DCAMS) is an Air Staff directed project to improve management and utilization of maintenance resources by enhancing and standardizing flow and availability of ADP logistics information. CAMS will support all base-level aircraft, engines, trainers, support equipment (SE), test equipment, missiles, munitions, and communications-electronics maintenance. According to the CAMS Functional Description, a deployable version of CAMS (CAMS Phase VI) will be capable of supporting the maintenance units with deployable systems suitable for the full range of required operational scenarios.
- c. Information Processing System (IPS) - See Section 5.2.1.1. for a comprehensive system description. Approximately 75% of IPS assets will be deployable.
- d. AFIRMS - The charter of AFIRMS is to present clearly and concisely the readiness information needed by commanders and other users at all command levels in peacetime, crisis, and war (to the extent that AFIRMS is survivable). This requires that AFIRMS be deployable, either in a stand-alone mode, or possibly in conjunction with another deployable ADP system (i.e., IPS).

Given the severe airlift limitations that typically prevail during a unit deployment for exercises or crisis/contingency situations and Air Force concerns about the development of "stovepipe" ADP systems, it is not to the unit's benefit to deploy several different ADP systems to the same location.

This argues for an integrated development of unit deployment ADP requirements. This will minimize:

- a. The use of limited resources to airlift multiple deployable ADP systems.
- b. A possible underutilization of the deployed ADP systems.
- c. Inconsistencies in data resident in two or more of these ADP systems.
- d. The equipment operating problems associated with several different multiplexers, communications lines, modems, power supplies, and encryption devices.
- e. Deployed ADP systems that may not talk to one another.

It is hoped that the CSS will include fuels data (loaded at the deployed location), that the DCAMS will provide all of the aircraft data that the MAC IPS and AFIRMS will need, and that the IPS and AFIRMS will not duplicate functions.

5.1.2 The Rescue and Operational Support Airlift Unit Detachments. The rescue and operational support airlift units can not operate as integral squadrons from a single base as can strategic and tactical airlift units. A number of factors (e.g., aircraft range, "customer" locations, etc.) prohibit this centralization and to ignore those factors would cause the units to be underutilized. The end result of this decentralization is that the squadrons are broken into detachments of 2 to 4 aircraft per detachment. As described in Sections 2.6 and 2.8, the squadron may have from 3 to 10 detachments and be located at 4 to 11 bases (parent squadron's base plus each detachment's base).

One problem with this "fragmentation" of the squadron (and thus, of the wing) is the logistical problem of collecting this distributed resource data, the "non-ownership" aspect of the resource data, and the wide geographic area over which the detachments are stationed. For example, the 67 ARRS is stationed in England, and has detachments in Iceland, Spain, and Germany. Closer to home, the 37 ARRS has 10 detachments in 10 states west of the Mississippi river. The 39 ARRW, to which both of the squadrons just mentioned belong, covers 24 locations in the CONUS and Europe.

Another problem is that the small size of these detachments makes provision of an AFIRMS system to each detachment problematical for economic reasons. When the number of resources involved is very small (e.g., 2 to 3 aircraft, 3 to 4 aircrews, etc.) the human mind is adequate for determining the detachment's capability. Further, in the case of air rescue, the wartime tasking appears to be less stringent than the peacetime tasking. Thus, if it is axiomatic that the air rescue units are always fully capable of accomplishing their wartime tasking, it is possible that they may not have a need for AFIRMS.

Thus, it would appear to be more appropriate to implement AFIRMS at the wing and squadron levels with, perhaps, terminals at the detachments for data input purposes.

5.1.3 Unique 23rd AF Requirements. The 23rd Air Force was established in March of 1983 to manage the non-airlift assets of MAC. The missions of these diverse units are Air Rescue, Weather Reconnaissance, Aeromedical Airlift, Operational Support Airlift, and Special Operations. The "young" status of the 23rd Air Force means that it has not yet been fully integrated into the MAC ADP plans. That is to say, the non-airlift requirements of the 23rd Air Force have not been fully incorporated into the airlift ADP systems/plans. For example, the MAC IPS, described in detail in Section 5.2.1.1, does not include the 23rd Air Force units (although Headquarters, 23rd Air Force did not exist when the MAC studies were done in preparation for IPS, the 23rd Air Force units did exist during that time (except for Special Operations)).

As discussed in Section 5.2.1.1.7, the primary application of the IPS will be for the strategic and tactical airlift missions. It is unknown at this time whether IPS will be implemented for the 23rd Air Force units. The widely diverse missions, as well as their dissimilarity with the normal airlift mission, may require that an automated support system be designed especially for the needs of the 23rd Air Force units. It is therefore advisable to postpone AFIRMS implementation at the 23rd Air Force units until the requirements issues for new ADP systems at the 23rd Air Force units has been resolved.

5.2 Implementation Recommendations. The implementation recommendations outlined in this section rely heavily on some of the basic components of the MAC plan for the upgrade of its command and control system. Thus, it is appropriate at this point to provide an overview of the MAC Command and Control Upgrade Program, specifically those areas that relate to the AFIRMS implementation.

5.2.1 MAC Command and Control Upgrade Program. The MAC Command and Control (C2) Upgrade Program is a major effort within MAC to provide adequate, secure communications and automated support to the command and control functions associated with MAC's airlift mission. There are 15 major programs or solution elements involved in this effort. The one program of major interest/benefit to the AFIRMS Program is the Information Processing System (IPS).

5.2.1.1 IPS System Description. The IPS program is currently in the late stages of the Concept Development Phase of its development life cycle. The Program Management Directive (PMD) was published in January 1984 and the Program Management Plan (PMP) was published in April 1985. The draft System Operational Concept (SOC) document was published in May 1985, and the final SOC was forwarded to the Air Staff for comment in August/September 1985.

The IPS is proposed as a network of automated support capabilities designed to aid MAC personnel in performing the command and control functions associated with the execution planning, scheduling, and execution of MAC's airlift mission. It provides for the integrated management of the airlift mission and the assets available to accomplish it. The automated support capabilities of the IPS are planned to support a multitasking, multiuser environment. The IPS will provide explicit command and control support in the principle areas of Command (CC), Operations (DO), Air Transportation (TR), Logistics (LG), and Intelligence (IN). In addition, other functions such as aircraft maintenance, mobility and weather will be supported to provide an integrated command and control capability.

Successful implementation of the IPS is largely dependent upon the improvements to MAC's organic communications capabilities (e.g., improved HF radio, UHF SATCOM, COMSEC equipment), which are being addressed as a series of corollary projects under the overall MAC C2 Upgrade Program. IPS implementation is based on the assumption that the necessary enhancements to MAC's communications capabilities will be acquired and available for use when the IPS is installed.

The IPS will be developed as a highly reliable system of equipments organized into a hierarchical system of nodes. It will be configured to provide direct support to all ground MAC command and control echelons from HQ MAC to the airlift unit (e.g., wing, a group, or a squadron). Approximately 75% of the IPS systems will be deployable systems for the COMALF, ALCCs, ALCEs, and the Tactical Airlift Squadrons.

- a. **IPS Architecture.** The IPS will be structured as a distributed processing system. The distributed data processing environment and the need for a survivable data base, both for day-to-day transactions and for summary and historical data, establish the requirement for a distributed data base architecture.

The IPS is designed to be capable of providing worldwide interconnectivity between the MAC command echelons using the available commercial and military communications systems along with the communications enhancements that are included in the MAC C2 Upgrade Program.

- b. **IPS Control.** IPS is being designed to operate as a "push" system, that is, data is sent from one node to another. Direct access to data bases at other nodes will not be allowed. If data is required, the user will send a request for data to a node and that node will gather the data and "push" (send) it to the requesting node.
- c. **IPS Mission Scenarios.** The IPS will be designed to support not only wartime C2 requirements, but all other scenarios as well, including peacetime operations, exercises, emergencies, crises, etc., in both fixed and deployed locations. All airlift forces, whether MAC-assigned or theatre-assigned, are included in the IPS. In addition, the number of systems required for IPS are projected to meet the Air National Guard (ANG) and AF Reserve (AFRES) requirements.

The primary application of the IPS will be in the areas of intertheatre or strategic airlift (i.e., deployment and redeployment including resupply), and intratheatre or tactical airlift (i.e., employment including resupply).

- d. IPS Survivability. The IPS will be structured as a distributed processing system with each command echelon having sufficient organic processing capability to permit autonomous operations as necessary. Each node will be capable of sustained periods of autonomous operation in the event of loss of connectivity to the MAC-wide IPS network, and will be capable of supporting degraded operations in a manual mode in the event of catastrophic failure of the IPS equipment. IPS implementation will provide for a transaction audit trail to facilitate the resumption of manual procedures as required.
- e. IPS Security. All communications links, both intra- and interechelon, will be secured and all interfacing hardware will be TEMPEST certified. The majority of the information processed within the IPS will be unclassified, although the system will be capable of processing classified information up to and including SECRET.
- f. IPS Implementation. Implementation of the IPS is proposed as an evolutionary process (extending over approximately ten years) having phased increments, each providing a significant, demonstrable extension of the IPS capabilities. MAC's operational environment is well suited to an evolutionary development of the IPS, both from the point of view of incremental development of the system, and from the perspective of implementing the system command wide.

5.2.2 Recommended AFIRMS MAC Implementation Alternatives. The IPS concept as outlined in Section 5.2.1.1 above is both consistent and compatible with AFIRMS requirements. It follows, then, that AFIRMS implementation at MAC should be synchronized with the IPS. Two basic options present themselves:

- a. Include AFIRMS in the IPS network.
- b. Interface with the IPS for data collection purposes.

5.2.2.1 Include AFIRMS in the IPS Network. Because the IPS is still in its early design stages, there may be sufficient time for HQ USAF to coordinate with HQ MAC for purposes of ensuring that IPS will, in fact, be able to accommodate AFIRMS. Basically, AFIRMS would be another processor node in the IPS local area network.

It is still too early in the IPS development process to ascertain whether it can fulfill all of AFIRMS' data requirements. It appears at this time that most of the data will be available, with the possible exception of fuels and spares resource status and resupply data. The precise data requirements for IPS have not yet been defined/documentated, precluding further analysis of this issue at this time. However, early integration of AFIRMS requirements could ensure AFIRMS data availability as IPS development progresses.

SofTech's research indicates that IPS will have the hardware and software functionality to support AFIRMS. This then consigns to IPS the resolution of complex issues such as how to most effectively:

- a. Interface with other Air Force systems.
- b. Implement multi-level security operations/processing.
- c. Ensure the availability of adequate communications capabilities.

5.2.2.2 Interface with the IPS for Data Collection Purposes. Should it not be possible, due to budgetary, organizational, or time constraints, to host AFIRMS in the IPS network, it is recommended that the AFIRMS system interface with the IPS for purposes of collecting the data needed for AFIRMS capability assessments. This approach is not as facile as that outlined above in 5.2.2.1, and its advantages are more limited;

- a. The number of AFIRMS interfaces to external MAC-unique systems will be greatly reduced since IPS will:
 - (1) Eventually subsume some MAC-unique ADP systems such as AIMS, MAIRS, and LRCCS.
 - (2) Interface with other external systems as required to maintain current and accurate MAC command and control data.
- b. IPS will still ensure the availability of adequate MAC organic communications capabilities.

APPENDIX A. SUMMARY OF AFIRMS DOCUMENT CHANGES FOR MAC

MAC research and analysis efforts have identified MAC-specific requirements which must be considered in implementing AFIRMS worldwide. These newly identified MAC requirements have been incorporated as Change 1 into AFIRMS documentation, and are in four general categories:

- a. Metric. Several units of measure (in addition to the "sortie") have been identified for MAC. As a result of the MAC (and concurrent SAC) metric analysis efforts, a candidate universal AFIRMS capability assessment metric has been identified. This metric is "mission." Changes to the Functional Description, System and Subsystem Specifications have been made to identify this AFIRMS universal metric as well as the alternative perspectives, i.e., sorties, flying hours, and ton-miles.
- b. ADP System Interface Candidates. Numerous ADP systems were identified as containing data required by AFIRMS algorithms. These systems have been included in the Functional Description, System and Subsystem Specifications.
- c. Command Structure. The AFIRMS reporting/command hierarchy views the Numbered Air Force (NAF) as simply a special case of the MAJCOM. The place of the NAF in this reporting structure has been will be clarified in the Functional Description, System and Subsystem Specifications.
- d. Data Requirements. In-depth analysis is needed to identify in detail the additional data elements required for MAC AFIRMS algorithms. However, the results of this preliminary MAC analysis will be added to the AFIRMS Data Requirements Document. As an example, the new universal metric and alternate perspectives will need new data elements. These will cascade into changes for each instance where the task or capability was expressed as sorties. A specific example of this is appearance number 56G (in the AFIRMS Data Requirements Document) named Unit Daily Integrated Sortie Capability. A corresponding appearance will need to be added for Mission, Flying Hour, and Ton-mile Capability.

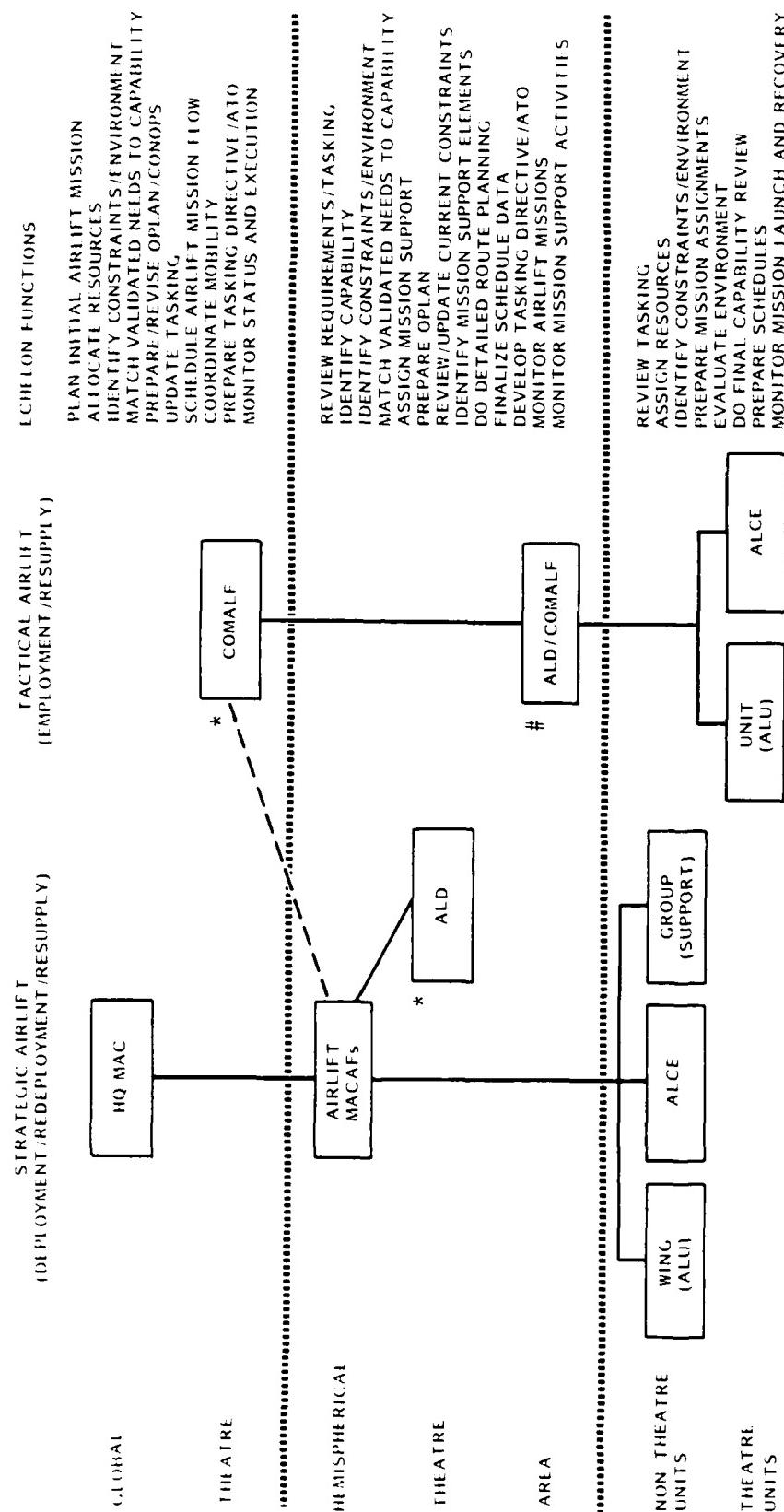
APPENDIX B. MAC AIRLIFT ORGANIZATION, RESPONSIBILITIES, AND OPERATIONAL INTERFACES

Organization of MAC airlift command and control is geographically oriented. All airlift forces, whether MAC-assigned or theatre-assigned, are included in the MAC Command and Control System. In a theatre, the Commander of Airlift Forces (COMALF) is tasked by the theatre Commander-in-Chief (CINC) or his designated agent and COMALF provides the necessary interface with the Air Force component commander. A typical structure and key interfaces are shown in Figure B-1.

In accordance with the geographically oriented concept of MAC command and control, each echelon at and above the Airlift Division (ALD) level is assigned a specific geographical area. The lower command and control echelons--specifically, Airlift Control Elements (ALCEs), and Airlift Coordination Centers/Military Airlift Support Squadrons (ACCs/MASSs) and other Airlift Units (ALUs)--do not have geographical responsibilities; rather they have responsibilities for physical airlift resources. Some echelons have a command and control center; this center represents the command function since it acts for the commander.

B.1 HQ MAC. As commander of a specified command, Commander-in-Chief, Military Airlift Command (CINCMAC) has global responsibility to accomplish airlift missions in support of other unified and specified commands. HQ MAC has ultimate responsibility for the effective and efficient use of assigned airlift resources. Acting on behalf of CINCMAC, the HQ MAC command center is the primary interface with the National Military Command Center, the Joint Deployment Agency, and the Air Force Command Post. From this center, MAC implements emergency action policies and procedures and interfaces with the JCS Crisis Action System.

When activated, the Crisis Action Team (CAT) develops the MAC concept of operations in support of specific JCS actions. The HQ MAC staff combines the



— Command
— Coordination

* Tri-Hatted as theatre ALD, COMALF, and the MAJCOM DCS for Airlift.
If no area ALD, then COMALF also does these functions.

Figure B-1. Typical Command & Control Structure and Functions Performed by Each Echelon

operations concept with validated airlift user requests to build the intertheatre airlift flow schedule based on total airlift capability. Mission execution authority/responsibility is delegated to the appropriate MACAF. HQ MAC will distribute the necessary resources to the MACAFs for assigned airlift missions. The Command Center monitors intertheatre airlift missions and all MAC-assigned resources worldwide with information from the MACAFs.

As the Civil Reserve Air Fleet (CRAF) is activated by the National Command Authority (NCA) or CINCMAC, the MAC staff contracts with individual airlines for each airlift mission. The HQ MAC CAT is the primary interface with the contracted airlines operations centers.

The HQ MAC Logistics Readiness Center (LRC) manages the MAC Command Center's logistics. The LRC distributes logistics resources (parts and people) between MACAFs, and is the primary MAC interface with external logistics agencies such as Air Force Logistics Command (AFLC) and the Defense Logistics Agency (DLA).

B.2 MAC Numbered Air Forces (MACAFs). Two numbered air forces, called MACAFs, share global airlift responsibility; each has defined geographical limits. The 21st Air Force has responsibility east of the Mississippi to Pakistan including South America and Africa. The 22nd Air Force's responsibility extends west from the Mississippi to Southwest Asia and includes Australia, New Zealand, and Alaska. (The 23rd Air Force of MAC has special, non-airlift responsibilities. Thus, it is not addressed in this appendix.)

Each MACAF, through its Operations Center, has execution authority/responsibility for MAC assigned airlift missions with resources allocated by CINCMAC. MACAFs perform detailed mission planning and task assigned airlift units with specific missions. MACAFs have primary responsibility for mission and flight-following of ongoing intertheatre missions and for monitoring the capability and status of assigned/allocated airlift resources.

Each MACAF LRC manages its MACAF Operations Center's logistics. It maintains current logistics status of all MAC assigned aircraft away from home station within the MACAF geographical area. The LRC verifies all parts requirements and conducts area searches for required parts, tools, support equipment, and specialists. MACAF LRCs coordinate the transportation of required resources to active airlift mission locations.

B.3 Commander of Airlift Forces (COMALF). The COMALF, a senior MAC commander designated by CINCMAC, manages all airlift resources within a given geographical area. This area usually has the same boundaries as the supported theatre or joint task force area. The COMALF has two distinct responsibilities: responsibility to the supported commander for theatre-assigned airlift resources control, and responsibility to CINCMAC through the appropriate MACAF commander for MAC-assigned airlift resources management. COMALF's responsibilities with respect to command, operations, logistics, and transportation are more closely related to those of HQ MAC than to a MACAF since the COMALF receives validated theatre airlift requests/tasking and must schedule an appropriate airlift flow. Just as HQ MAC assigns missions and resources to the MACAFs, the COMALF assigns mission requirements and the necessary airlift resources to subordinate airlift divisions (ALDs), if formed.

In addition, the COMALF has control responsibility for MACAF-scheduled missions operating within his assigned theatre. The positioning and use of strategic airlift resources such as stage aircrews and ALCEs allocated primarily in support of strategic airlift missions requires intensive coordination between MACAF and COMALF command and control centers. (The MACAF, however, retains ultimate control of MAC-assigned resources deployed in support of active intertheatre airlift missions).

Thus, COMALF is serving multiple commanders simultaneously. This is because the individual serving as COMALF wears multiple hats.

- One hat is COMALF for crisis/contingencies and exercises.

- A second hat is the ALD commander with which the MACAF strategic missions are controlled.
- A third hat is the theatre MAJCOM Deputy Chief of Staff (DCS) for Airlift.

B.4 Airlift Division (ALD). When formed by the COMALF, the area ALDs are responsible for command and control of airlift missions within an area assigned by the COMALF. An ALD's responsibilities with respect to command, operations, logistics, transportation, and intelligence are similar to those of a MACAF since missions are assigned to the ALD for detailed planning and execution. The size and mission intensity of a COMALF's theatre will dictate the need for and the number of ALDs with specific geographical responsibilities. Although task-related functional responsibilities are constrained geographically, intratheatre missions require intense coordination with other ALDs and the COMALF. Decisions made by the ALD concerning intertheatre missions require immediate upchannel reporting to and coordination with the COMALF. For intertheatre airlift missions operating within the ALD's assigned geographical area, complete mission information must be available to the ALD. The ALD's command center, an airlift control center (ALCC), will be the focal point for collection and dissemination of mission and unit information for both inter- and intratheatre missions operating within the ALD's geographical area. Requirements exceeding the ALD's responsibility and capability will be reported to and will become the responsibility of the COMALF.

B.5 Airlift Control Element (ALCE). The ALCE is a composite MAC organization made up of resources from various functional areas tailored to support airlift missions at locations where fixed MAC command and control centers are limited or nonexistent. The ALD controls an ALCE in support of a tactical airlift mission while a MACAF controls an ALCE on strategic airlift missions.

Although the ALCE's functional responsibility is limited to its assigned airfield, it must be able to access current intelligence, weather, air traffic, and airfield information for any area which an aircraft under its cognizance may operate into or through. This information is needed to prepare pre-mission briefings and to update transient aircrews.

B.6 Airlift Units (ALU). ALU is a general term encompassing several types of organizations. In general, they provide physical resources of airlift missions. These resources include aircraft, personnel, material handling equipment, maintenance equipment, support equipment, and supplies. The quantity and type of resource assigned to an ALU define that unit's functions and responsibilities. The primary types of ALUs are discussed below.

- a. An airlift wing is the largest and most complex ALU. It manages allocated aircraft and all associated support requirements while they are at the wing's location. The wing generates and supports airlift missions for the controlling MACAF (strategic) or ALD (tactical). The wing operations staff is responsible for detailed planning and final coordination of tasked airlift missions. The end product of this planning is a mission which both fulfills the MACAF or ALD tasking and is tactically sound for the aircrew.
- b. An airlift group has fewer allocated aircraft and less associated support than a wing. The functions and responsibilities are identical to those of a wing.
- c. An airlift squadron does not usually operate independently. Normally, the squadron only has aircrews. For a squadron to operate independently, it must be allocated aircraft, support personnel, and support equipment. A deployed airlift squadron will normally be collocated with or assigned to a group or wing and will draw upon the higher unit's command and control capability.
- d. Airlift Coordination Center/Military Airlift Support Squadron (ACC/MASS). The ACC/MASS organization provides airlift support at bases which are not owned by MAC or do not have a MAC flying unit but have a regular flow of MAC aircraft. The ACC/MASS does not have any assigned aircraft but does have support equipment and personnel. The ACC/MASS must coordinate closely with the host base command post to ensure adequate base support. ACC/MASS's functions and responsibilities are identical to those of a wing/group other than for intelligence.

B.7 Crisis Action Teams (CATs). HQ MAC, MACAFs, COMALFs, ALDs, and numerically designated airlift units (e.g., 437 MAW, 463 TAW) operate command centers having advisors specializing in each of the major functional areas. When crises or contingencies require intensive staff action and close control of airlift assets, Crisis Action Teams (CATs) are formed.

ATTACHMENT 1

SAMPLE AIRLIFT MISSION FLOW OUTPUT FROM HQ MAC FLOW GENERATOR

AIRLIFT FLOW PLAN ISRED - WORK COPY										AS OF 85 MAY 13	PCN UA324-7C1				
TIME 2209Z										TIME 2209Z					
PREPARED 05 JUN 25		TYPE		ARRIVAL DATE	TIME	STA	DEPARTURE DATE	TIME	REASON FOR STOP	CABIN LOAD DETAILS	OUT	CAUT CODE	FLY TIME	GRND TIME	A/C NBR
1100 / 80 C141B	0052	ORIGINATE	KJUM	2 APR 0700	FJS CC FUEL		2 APR 0700	FJS CC FUEL					300	215	069
		PAED	RJTY	2 APR 1215	ENR CC FUEL		2 APR 1215	ENR CC FUEL					845	215	069
		2 APR 2100	RJTY	2 APR 2313	ENR CC FUEL		3 APR 0330	ONL CC FUEL					200	215	069
		3 APR 0115	RKPS	3 APR 0745	ENR CC FUEL		3 APR 0745	ENR CC FUEL					745	215	069
		3 APR 0530	RJTY	3 APR 1645	ENR CC FUEL		4 APR 0345	OFF FUEL					645	215	069
		4 APR 0130	KCVS	4 APR 0345	OFF FUEL		4 APR 0700	TERMINATE DEPOS					315	069	
		4 APR 1700	KTCM												
1100 / 80 C141B	0052	FROM TU0767	RJTY	2 APR 2200	ENR CC FUEL		3 APR 0415	ONL CC FUEL					815	215	069
		3 APR 0200	RJTY	3 APR 0415	ONL CC FUEL		3 APR 0200	ONL CC FUEL					400	215	069
		3 APR 0815	RPHK	10 M00797	OFF CC FUEL		10 M00797	OFF CC FUEL					400	1045	069
1100 / 81 C130E	C116	FROM MDU769	RJDI	3 APR 0230	ENR CC FUEL		3 APR 0530	ONL CC FUEL					1400	046	
		3 APR 0330	RKTY	3 APR 0530	ONL CC FUEL		10 M0791	OFF FUEL					100	200	046
		3 APR 0630	RJDI												
1100 / 82 C141B	0053	ORIGINATE	KSEO	2 APR 0500	POS CC FUEL		2 APR 1415	ENR CC FUEL					600	215	067
		PAED	RJTY	2 APR 0515	ENR CC FUEL		3 APR 0515	ENR CC FUEL					845	215	067
		3 APR 0915	RKSY	3 APR 0945	ENR CC FUEL		3 APR 0945	ENR CC FUEL					200	215	067
		3 APR 0930	RJTY	3 APR 1730	PAED		3 APR 1730	PAED					745	315	067
		3 APR 1730	KVCV	4 APR 0200	TERMINATE OFF		4 APR 0200	TERMINATE OFF					515	067	
1100 / 83 C130F	0316	FROM TU0770	RJDI	3 APR 0330	ENR CC FUEL		3 APR 0630	ONL CC FUEL					1400	047	
		3 APR 0430	RJDI	3 APR 0630	ONL CC FUEL		10 M00793	OFF FUEL					100	200	047
		3 APR 0830	RJDI												
1100 / 84 C005A	0054	FROM F0624	RJTY	3 APR 0100	ENR CR FUEL		3 APR 0100	ENR CR FUEL					1745	053	
		3 APR 0300	RPSW	3 APR 0645	ONL CR FUEL		3 APR 0645	ONL CR FUEL					200	1715	053
		3 APR 1045	RPHK	10 M0814	OFF FUEL		10 M0814	OFF FUEL					400		
1100 / 85 C130	0055	ORIGINATE	KSO	3 APR 0700	ONL CC FUEL		3 APR 1130	ENR CC FUEL					145	215	918
		PAED	RJTY	3 APR 0845	ENR CC FUEL		3 APR 0845	ENR CC FUEL					730	918	
		3 APR 1330	PHNI	3 APR 1330	ENR CC FUEL		3 APR 1330	ENR CC FUEL							
1100 / 86 C141B	0056	FROM F0624	RDN	3 APR 0315	ENR CR FUEL		3 APR 0315	ENR CR FUEL					3930	037	
		3 APR 0515	RPSW	3 APR 0730	ONL CC FUEL		3 APR 0730	ONL CC FUEL					200	215	037
		3 APR 0930	RJTY	3 APR 1145	ENR CC FUEL		3 APR 1145	ENR CC FUEL					745	315	037
		3 APR 1930	PAED	3 APR 2245	ENR CC FUEL		3 APR 2245	ENR CC FUEL					515	215	037
		3 APR 0400	KVCV	4 APR 0615	OFF FUEL		4 APR 0615	OFF FUEL					145	037	
		4 APR 0800	KSHU	4 APR 0800	TERMINATE DEPOS		4 APR 0800	TERMINATE DEPOS							
1100 / 87 C11B	0057	FROM F0622	RJDI	5 APR 1045	ONL CC FUEL		5 APR 1045	ONL CC FUEL					415	011	
		5 APR 1315	RPHK	5 APR 1530	OFF FUEL		5 APR 1530	OFF FUEL					230	230	011
		5 APR 1600	RJDI	5 APR 0645	ENR CC FUEL		5 APR 0645	ENR CC FUEL					815	815	011

ATTACHMENT 1

SAMPLE AIRLIFT MISSION FLOW OUTPUT FROM HQ MAC FLOW GENERATOR (cont'd)

DATE PREPARED: 85 JUN 25 AS OF DATE/TIME OF PLAN DATA: 85 MAY 13 2209 HOURS

AIRLIFT FLOW PLAN WORK COPY

THE AIRLIFT FLOW PLAN PROVIDES A MISSION ITINERARY OF ALL STOPS, MISSION NUMBER, TYPE AIRCRAFT AND OPERATOR WILL ONLY BE PRINTED ON THE FIRST LINE OF THE MISSION ITINERARY. LOAD DESIGNATOR AND CABIN LOAD DETAILS ONLY APPEAR ON THOSE LINES WHERE THE TYPE STOP IS AN ONLOAD OR AN OFFLOAD

THE SEQUENCE OF THE INFORMATION IN THIS REPORT IS BY:

MISSION NUMBER
IF THE MISSION NUMBER WAS INCLUDED IN THE ABOVE SORT SEQUENCE, IT DOES NOT INCLUDE THE MISSION NUMBER PREFIX.

THE FOLLOWING IS AN EXPLANATION OF THE REPORT ITEMS

MSN NBR - 1ST POSITION IS ALPHABETIC THIS DESIGNATES THE 'USER' OF THE MISSION. REMAINING 6 CHARACTERS ARE FROM THE FLOWN BASIC MISSION NUMBER AND WILL BE NUMERIC WITH ZERO FILL.
TYPE ACFT - MODEL DESIGN AND SERIES OF THE AIRCRAFT THAT WILL FLY THE MISSION.
OPER - UNIT OR COMMERCIAL CARRIER OPERATING THE MISSION.
ARRIVAL DATE/ TIME - INDICATES SCHEDULED ARRIVAL TIME AT STATION OF EVENT. FROM XNNNNN, INDICATES THE PREVIOUS MISSION THAT HAS FLOWN BY THIS AIRCRAFT. ORIGINATE IDENTIFIES ORIGINATING MISSIONS.
STA - STATION CODE FOR WHICH EVENT IS PRINTED.
DEPART DATE/ TIME - INDICATES SCHEDULED DEPARTURE TIME FROM STATION OF EVENT. TO XNNNNN, INDICATES THE NEXT MISSION THAT WILL BE FLOWN BY THIS AIRCRAFT. TERMINATE IDENTIFIES THE TERMINATING OR FINAL MISSION FOR THIS AIRCRAFT.
REASON FOR STOP - INDICATES WHY THIS MISSION IS TRANSITING THIS STATION. ABBREVIATED CODES USED ARE EXPLAINED AS FOLLOWS

ON - ONLOADING TROOPS OR CARGO	OFF - OFFLOADING TROOPS OR CARGO
POS - POSITION TYPE MISSION	DISP - DISPOSITION NO TYPE MISSION
FUEL - TAKE ON/FULL AT THIS STOP	DEPOS - DEPOSITION AT THIS STOP
CRW - CREW REST NEEDED AT THIS STOP	CC - AGM - BASIC CREW CHANGE REQUIRED AT THIS STOP
RCV - RECOVERY ACTIVITY AT THIS STOP	ARMED - AUGMENTED CREW CHANGE REQUIRED AT THIS STOP
AIRDROP - AIRDROP PARACHUTE	AIRFUEL - AIRIL REFUELING SCHEDULED AT THIS POINT
OFFLOADING VIA - OFFLOADING VIA	RUNOFF - LEAVE ENGINES RUNNING
LOAD DESIGNATOR - THE FIRST EIGHT CHARACTERS ARE THE UNIT DESIGNATOR FOR OPCODE OR THE F. IN FOR AN OFPLAN. CHARACTERS 9-11 ARE THE AIRCRAFT CONFIGURATION CHARACTER 12-15 IS THE SORTIE NUMBER FOR THE SPECIFIED UNIT OR F.R.N. IN AN OFPLAN. THE F.R.N. MAY REFLECT A LUMP DESIGNATOR (LMP) AND NUMBER WHICH INDICATES MORE THAN ONE F.R.N. MAY BE ON THIS MISSION. REFER TO THE 'LUMPED REQUIREMENTS' REPORT OR TO THE 'AIRLIFT MOVEMENT SUMMARY' TO DETERMINE WHICH F.R.N. (S) ARE ON THIS MISSION.	
CABIN LOAD DETAILS - CODES AND EXPLANATIONS FOLLOW	
TPS - PASSENGERS/TROOPS	BULK CARGO TONS/TENTHS
OVER - OVERSIZE CARGO	OUT - OUT CARGO FIELDS ON THIS MISSION AT THIS STATION
TOTAL CARGO - TOTAL CARGO, TONS/TENTHS	
CAUT CODE - CAUTION CODE (S) TAKEN FROM FLOWN DATA BASE. CODES ARE: S=MISSION SLIPPED DUE TO A CHOKE STATION, C=FORCED A CREW CHANGE AT STATION OF EVENT, F=FORCED REFUELING AT STATION OF EVENT, N=INDIRECT ROUTING THROUGH A NOTIONAL POINT, T=MISSION SLIPPED DUE TO A STATION STATION.	
IF THE WORK COPY WAS REQUESTED, THE FOLLOWING NO CODES APPLY	

THE VARIABLE HEADING FOR THIS REPORT - TAB C TO APPENDIX 9 TO ANNEX C TO MAC OFORD
THE VARIABLE FOOTING FOR THIS REPORT - E-9-C
DATE RANGE OF DATA SELECTED IS - ALL DAYS OF PLAN WERE SELECTED
MISSION NUMBER RANGE SELECTED FOR THIS RUN ARE MISSION NUMBER 00001 THROUGH (AND INCLUDING) MISSION NUMBER LAST

2

END

OTIC

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